CLAIMS

WE CLAIM:

1. An air turbine starter, comprising:

a starter housing adapted to couple to a gearbox assembly, the starter housing including an opening configured to provide fluid communication between the gearbox assembly and the starter housing; and

a check valve assembly disposed within the opening, the check valve assembly comprising:

a valve body having an inlet port, an outlet port, and a flow passage therebetween;

a valve seat coupled to the valve body, the valve seat extending at least partially into the flow passage and having an opening therethrough; and

a valve element disposed within the flow passage between the valve seat and the valve body outlet port, the valve element configured to translate axially between an open position and a closed position in response to a pressure differential between the inlet and outlet ports.

2. The air turbine starter of claim 1, wherein the valve body comprises:

a backing plate; and

a cage coupled to the backing plate, wherein at least one portion of the cage extends across the valve body flow passage.

3. The air turbine starter of claim 2, wherein the valve element includes a protrusion extending from a surface thereof and configured to selectively contact the at least one portion of the cage.

4. The air turbine starter of claim 2, wherein the at least one portion of the cage includes a protrusion extending from a surface thereof and configured to selectively contact the valve element.

5. The air turbine starter of claim 1, wherein the elastomeric valve seat further includes an annular protrusion disposed at least partially within the flow passage, wherein the annular protrusion sealingly couples to the valve element when the valve element is in the closed position.

6. The air turbine starter of claim 1, wherein the valve seat is elastomeric.

7. The air turbine starter of claim 1, wherein the valve seat is smoothly ground.

8. The air turbine starter of claim 1, wherein the valve element is made of a low density material.

9. A check valve assembly, comprising:

a valve body having an inlet port, an outlet port, and a flow passage therebetween;

a valve seat coupled to the valve body, the valve seat extending at least partially into the flow passage and having an opening therethrough;

a valve element disposed within the flow passage between the valve seat and the valve body outlet port, the valve element configured to translate axially between an open position and a closed position in response to a pressure differential between the inlet and outlet ports.

10. The check valve assembly of claim 9, wherein the valve body comprises:

a backing plate; and

a cage coupled to the backing plate, wherein at least one portion of the cage extends across the valve body flow passage.

11. The check valve assembly of claim 10, wherein the valve element includes a protrusion configured to selectively contact the at least one portion of the cage.

12. The check valve assembly of claim 10, wherein the at least one portion of the cage includes a protrusion configured to selectively contact the valve element.

13. The check valve assembly of claim 9, wherein the valve seat further includes an annular protrusion disposed at least partially within the flow passage, wherein the annular protrusion sealingly couples to the valve element when the valve element is in the closed position.

14. The check valve assembly of claim 9, wherein the valve seat is elastomeric.

15. The check valve assembly of claim 9, wherein the valve seat is smoothly ground.

16. The check valve assembly of claim 9, wherein the valve element is made of a low density material.

17. A check valve assembly, comprising:

a backing plate having an outlet port;

a cage coupled to the backing plate, the cage having an inlet port, wherein a flow passage extends between the inlet port and the outlet port;

a valve seat coupled to the backing plate, the valve seat extending at least partially into the flow passage and having an opening therethrough; and

a valve element disposed within the flow passage between the valve seat and the inlet port, the valve element configured to translate axially between an open position and a closed position in response to a pressure differential between the inlet and outlet ports.

18. The check valve assembly of claim 17, wherein the valve element includes a protrusion configured to selectively contact the at least one portion of the cage.

19. The check valve assembly of claim 17, wherein the at least one portion of the cage includes a protrusion configured to selectively contact the valve element.

20. The check valve assembly of claim 17, wherein the valve seat further includes an annular protrusion disposed at least partially within the flow passage, wherein the annular protrusion sealingly couples to the valve element when the valve element is in the closed position.

21. The check valve assembly of claim 17, wherein the valve seat is elastomeric.

22. The check valve assembly of claim 17, wherein the valve seat is smoothly ground.

23. The check valve assembly of claim 17, wherein the valve element is made of a low density material.